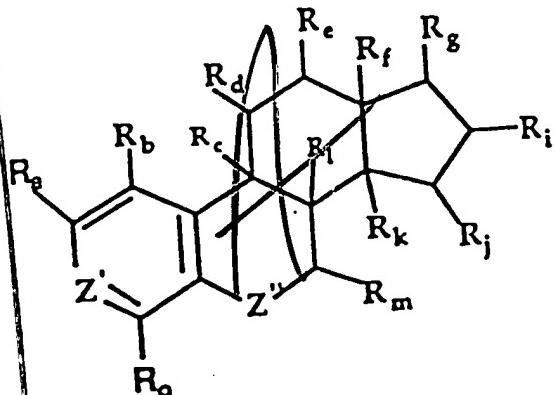


Claims

1 1. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:

7



8 wherein:

9 I. R_a-R_o are defined as follows:
10 A) each R_a, R_b, R_c, R_d, R_e, R_f, R_i, R_j, R_k, R_l,
11 R_m, R_o, independently is -R₁, -OR₁,

12 -OCOR₁, -SR₁, -I, -NHR₂, -Br,
13 is -R₁, -OR₁, -OCOR₁, -SR₁, -F, -NHR₂, -Br,
14 -I, or -C≡CH;

15 or

B) each R_a , R_b , R_c , R_f , R_k , R_1 , R_o , independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and each R_d , R_e , R_i , R_j , R_m , independently is $=0$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$; and R_g is $=0$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$, or $-C\equiv CH$;

23 and

24 II. Z' is defined as follows:

31 or

B) Z' is $=C-X'-$ or $-X'-C=$, where R_n
 $\quad \quad | \quad \quad |$
 $\quad R_n \quad R_n$
is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
and X' is X , as defined above; or X' is
 $>C=O$;

38 and

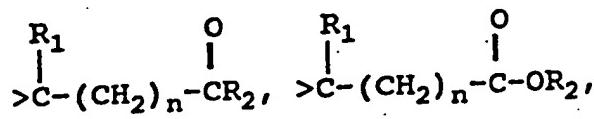
38 III "Z" is defined as follows:

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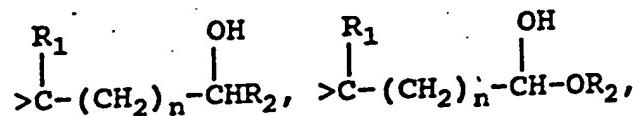
A) Z'' is Y, where Y is $-O-$, $-N-$, $>CHR_1'$

$>C=O$, $>C-(CH_2)_nOR_2'$

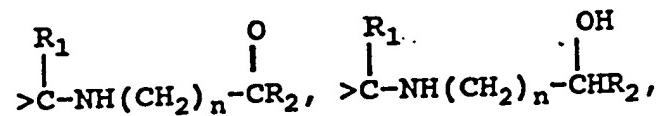
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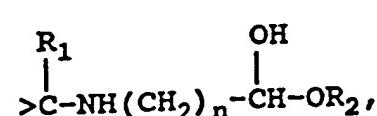
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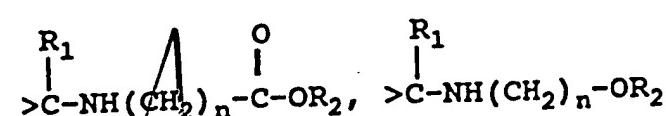
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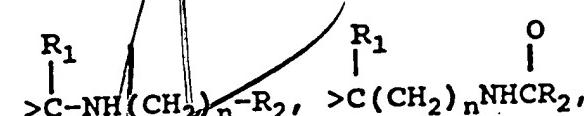
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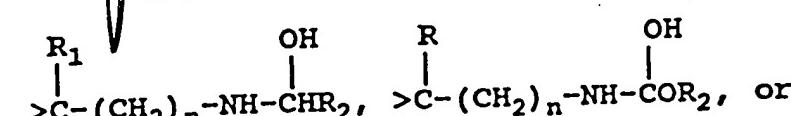
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73 or

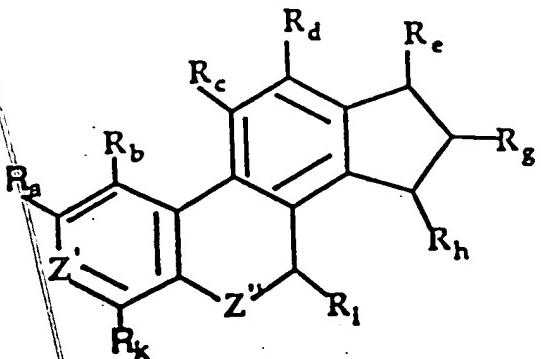
B) Z'' is $-Y-CH-$ or $-CH-Y-$ where R_p
 R_p R_p
is $-R_1, -OR_1, -SR_1, -F, -NHR_2, -Br$ or $-I$;

78 and

IV. provided that when each $R_b, R_c, R_d, R_e, R_i, R_j, R_k$,
 R_l, R_m and R_o is H;
 R_f is $-CH_3$;

82 R_g is -OH;
83 Z' is >COH; and
84 Z'' is >CH₂;
85 then R_a is not -H;
86 where, in each formula set forth above, each R_1 and R_2
87 independently is -H, or substituted or unsubstituted alkyl,
88 alkenyl or alkynyl group of 1-6 carbons.

1 2. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:



8 wherein:

9 I. R_a - R_k are defined as follows:

10 A) each R_a , R_b , R_c , R_d , R_g , R_h , R_i , R_k
11 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
12 $-F$, $-NHR_2$, $-Br$, or $-I$; and R_e is $-R_1$, $-OR_1$,
13 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;

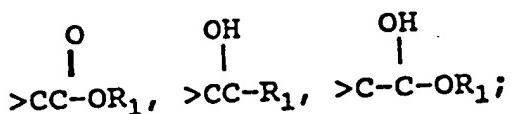
14 or

15 B) each R_a , R_b , R_c , R_d , R_k , independently is
16 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or
17 $-I$; and each R_{eg} , R_h , R_i , independently is
18 $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-Br$, or
19 $-I$; and R_e is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
20 $-F$, $-Br$, $-I$ or $-C\equiv CH$;

21 and

22 II. Z' is defined as follows:

23 A) Z' is X , where X is $>COR_1$, $>CC-R_1$,



29 or

30 B) Z' is $=C-X'-$ or $-X'-C=$, where R_n
31



33 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,
34 and X' is X , as defined above;
35 or X' is also $>C=O$;

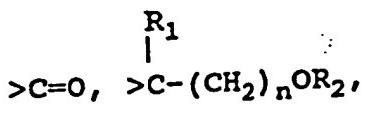
36 and

37 III. Z'' is defined as follows:

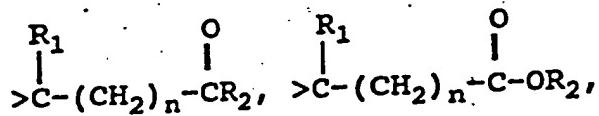
38 A) Z'' is Y , where Y is $-O-$, $-N-$, $>CHR_1$,



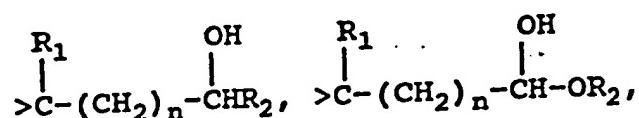
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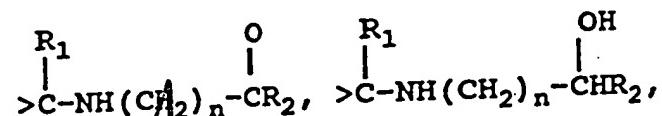
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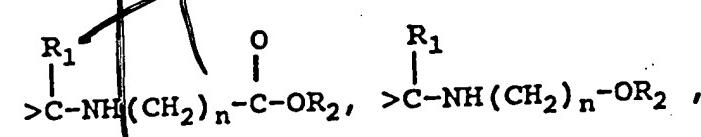
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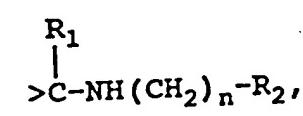
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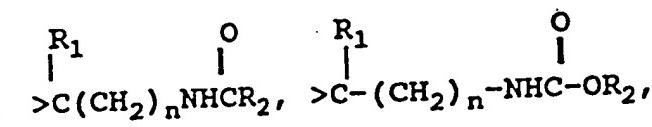
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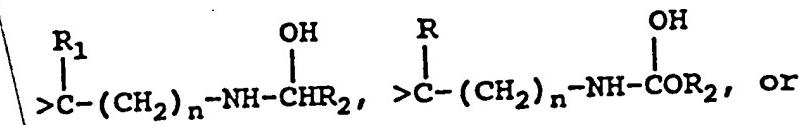
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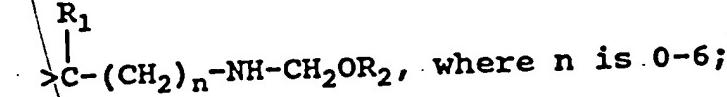
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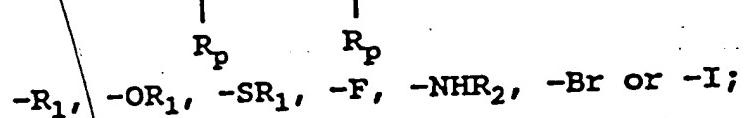
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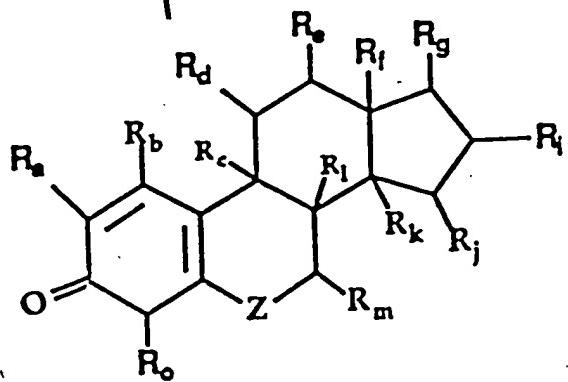
B) Z'' is $-Y-CH-$ or $-CH-Y-$, where R_p is

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76 where, in each formula set forth above, each R₁ and R₂
77 independently is -H, or substituted or unsubstituted alkyl,
78 alkenyl or alkynyl group of 1-6 carbons.

1 3. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:



8 wherein:

9 I. R_a-R_o are defined as follows:
10 A) each R_a, R_b, R_c, R_d, R_e, R_f, R_i, R_j, R_k, R_l,
11 R_m, R_o independently is -R₁, -OR₁, -OCOR₁,
12 -SR₁, -F, -NHR₂, -Br, or -I; and R_g is -R₁,
13 -OR₁, -OCOR₁, -SR₁, -F, -NHR₂, -Br, -I or
14 -C≡CH;

15 or

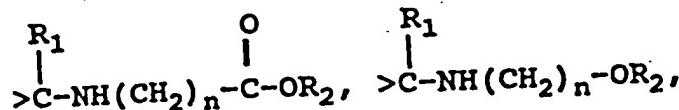
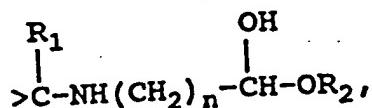
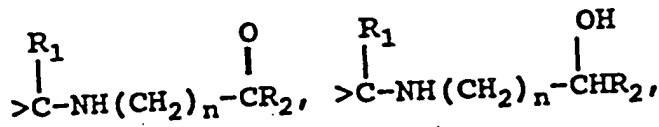
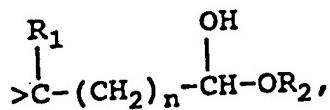
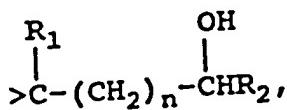
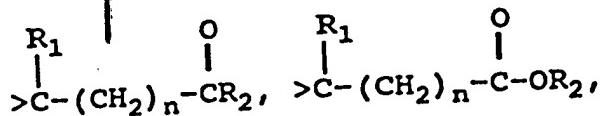
16 B) each R_a , R_b , R_c , R_f , R_k , R_l , independently
17 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
18 or $-I$; and each R_d , R_e , R_i , R_j , R_m , R_o
19 independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
20 $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g is $=O$,
21 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$
22 or $-C\equiv CH$;

23 and

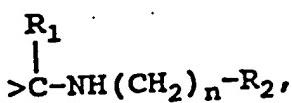
24 II. Z is defined as follows:

25 A) Z is Y , where Y is $-O-$, $-N-$, $>CHR_1$,

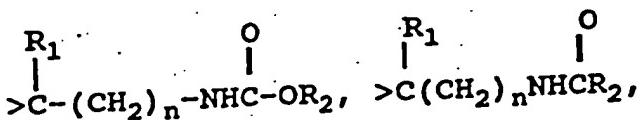
26 $>C=O$, $>C-(CH_2)_nOR_2$,



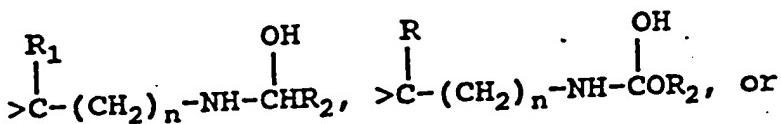
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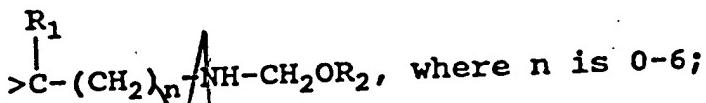
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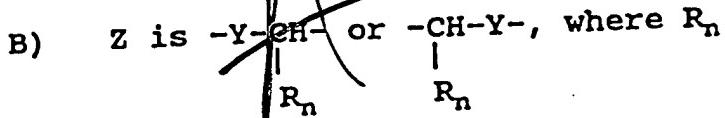
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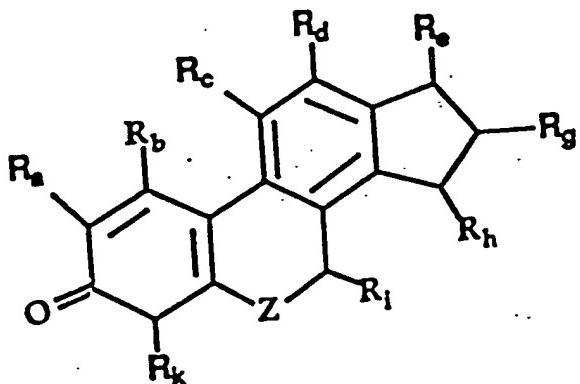


62 or



~~R_n R_n~~
is -R₁, -OR₁, -SR₁, -F, -NHR₂, -Br or -I;
where, in each formula set forth above, each R₁ and R₂
independently is -H, or substituted or unsubstituted alkyl,
alkenyl or alkynyl group of 1-6 carbons.

1 4. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:



7 wherein:

8 I. $R_a - R_k$ are defined as follows:

9 A) ~~each $R_a, R_b, R_c, R_d, R_g, R_h, R_i, R_k$~~
 10 independently is $-R_1, -OR_1, -OCOR_1, -SR_1,$
 11 $-F, -NHR_1, -Br, \text{ or } -I;$ and R_e is $-R_1, -OR_1,$
 12 $-OCOR_1, -SR_1, -F, -NHR_1, -Br, -I \text{ or } -C\equiv CH;$

13 or

14 B) each R_a, R_b, R_c, R_d , independently is $-R_1,$
 15 $-OR_1, -OCOR_1, -SR_1, -F, -NHR_1, -Br, \text{ or } -I$
 16 and each R_g, R_h, R_i, R_k independently is
 17 $=O, -R_1, -OR_1, -OCOR_1, -SR_1, -F, -NHR_1, -Br$
 18 or $-I;$ and R_e is $=O, -R_1, -OR_1, -OCOR_1,$
 19 $-SR_1, -F, -NHR_1, -Br, -I \text{ or } -C\equiv CH;$

20 and

21 II. Z is defined as follows:

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24

A) Z is Y, where Y is -O-, -N-, >CHR₁,

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$$>\text{C}=\text{O}, >\text{C}-\text{(CH}_2\text{)}_n\text{OR}_2,$$

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$$>C-(CH_2)_n-CR_2, >C-(CH_2)_n-C-OR_2,$$

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$$>C-(CH_2)_n-CHR_2, >C-(CH_2)_n-CH-OH$$

34
35
36

$$>C-NH(CH_2)_n-CR_2, >C-NH(CH_2)_n-CHR_2,$$

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42

$$>C-NH(CH_2)_n-C(=O)-OR_2, >C-NH(CH_2)_n-OR_2,$$

43

44

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$$>C-NH(CH_2)_n-R_2, >C(CH_2)_nNHCR_2$$

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$$>C_1^-(CH_2)_n-NHC-OR_2,$$

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$$>C-(CH_2)_n-NH-CHR_2, >C-(CH_2)_n-NH-COR_2, \text{ or}$$

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5
5

R_1
 $>C-(CH_2)_n-NH-CH_2OR_2$, where n is 0-6;

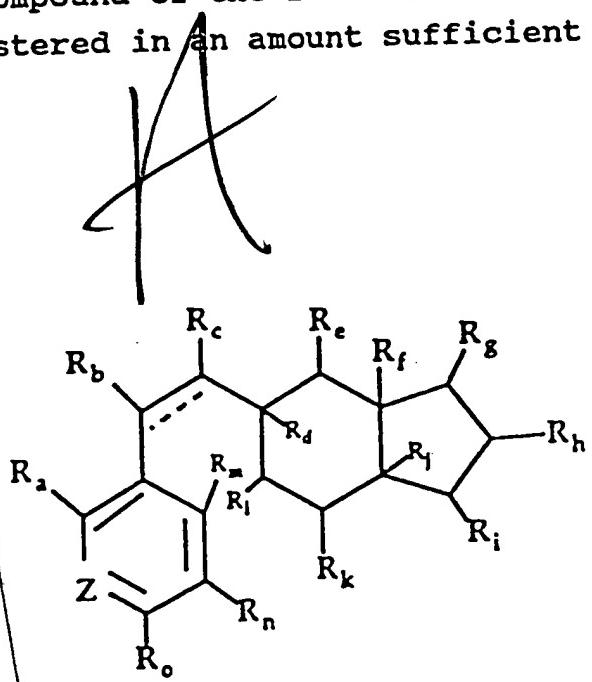
55 25

b) Z is $-\text{Y}-\text{CH}-$ or $-\text{CH}-\text{Y}-$, where R_n

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57
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- 25 -

1 5. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:



8 wherein:

I. $R_a - R_o$ are defined as follows:

9 1. $R_a R_o$ are both
 10 A) each R_a , R_b , R_c , R_d , R_e , R_f , R_g , R_h , R_j , R_k ,
 11 R_l , R_m , R_n , R_o independently is $-R_1$, $-OR_1$,
 12 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_i
 13 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
 14 $-I$ or $-C\equiv CH$;

15 or

16 B) each R_a , R_d , R_f , R_j , R_m , R_n , R_o
17 independently is $-R_1$, $-OR_1$, $-OCR_1$, $-SR_1$,
18 $-F$, $-NHR_2$, $-Br$, or $-I$; and each R_b , R_c R_e ,
19 R_g , R_h , R_k , R_l independently is $=O$,
20 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or
21 $-I$; and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
22 $-F$, $-Br$, $-I$ or $-C\equiv CH$;

23 or

c) each R_a , R_b , R_c , R_d , R_f , R_j , R_m , R_n , R_o independently is $-R_1$, $-OR_1$, OCR_1 , $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ and each R_e , R_g , R_h , R_k , R_l independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-Br$, $-I$ or $-C\equiv CH$;

31 II. Z is defined as follows:

A) Z is X, where X is >COR₁, >CC-R₁, >CC-OR₁,

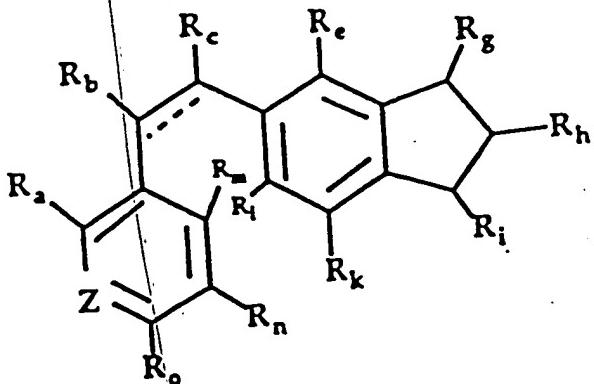
38 or

B) Z is $=C-X'-$ or $-X'-C=$, where R_p

is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
 and X' is X , as defined above;
 or X' is $>C=O$;

44
45 where, in each formula set forth above, each R₁ and R₂
46 independently is -H, or substituted or unsubstituted alkyl,
47 alkenyl or alkynyl group of 1-6 carbons; and the bond
48 indicated by C \cdots C is absent or, in combination with the C-C
49 bond, is the unit HC=CH.

1 6. A method for treating a mammalian disease
2 characterized by abnormal cell mitosis, said method
3 comprising administering to a mammal a cell-mitosis-
4 inhibiting compound of the formula below, said compound
5 being administered in an amount sufficient to inhibit cell
6 mitosis:



8 wherein:

- 9 I. R_a - R_o are defined as follows:
- 10 A) each R_a , R_b , R_c , R_e , R_g , R_h , R_k , R_l , R_m , R_n ,
11 R_o independently is $-R_1$, $-OR_1$, $-OCOR_1$,
12 $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_i is $-R_1$,
13 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or
14 $-C\equiv CH$;
- 15 or
- 16 B) each R_a , R_e , R_l , R_m , R_n , R_o independently
17 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
18 $-I$ and each R_b , R_c , R_g , R_h is $=O$, $-R_1$,
19 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$;
20 and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$,
21 $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;
- 22 or
- 23 C) each R_a , R_b , R_c , R_e , R_k , R_m , R_n , R_o
24 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
25 $-F$, $-NHR_2$, $-Br$, $-I$, and each R_h , R_i
26 independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
27 $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=O$,
28 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$
29 or $-C\equiv CH$;

30 and

- 31 I. z is defined as follows:

- 32 A) z is X, where X is $>COR_1$, $>CC-R_1$, $>CC-OR_1$,
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- 35 $\begin{array}{c} OH \\ | \\ >CC-R_1 \end{array}$ $\begin{array}{c} OH \\ | \\ >CC-OR_1 \end{array}$
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38 or

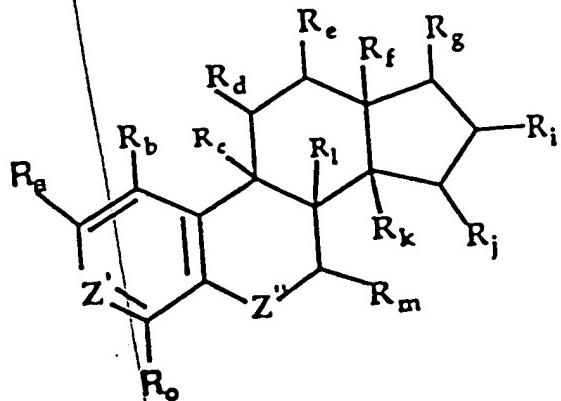
39 B)

40 Z is $=C-X'-$ or $-X'-C=$, where R_p
41 |
42 |
43 R_p

44 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,
45 and X' is X , as defined above;
46 or X' is $=O$;

47 where, in each formula set forth above, each R_1 and R_2
48 independently is $-H$, or substituted or unsubstituted alkyl,
49 alkenyl or alkynyl group of 1-6 carbons; and the bond
 indicated by $C\dots C$ is absent or, in combination with the $C-C$
 bond is the unit $HC=CH$.

1 7. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:
3



4 wherein:

I. $R_a - R_o$ are defined as follows:

5 I. $R_a - R_o$ are derived as
 6 (A) each R_a , R_b , R_c , R_d , R_e , R_f , R_i , R_j , R_k , R_l ,
 7 R_m , R_o , independently is $-R_1$, $-OR_1$,
 8 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g
 9 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
 -I or $-C\equiv CH$;

11 or

(B) each R_a , R_b , R_c , R_f , R_k , R_l , R_o , is $-R_1$,
 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $=I$;
 and each R_d , R_e , R_i , R_j , R_m , independently
 is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$,
 $-Br$ or I ; and R_g is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
 $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;

18 and

11. Z' is defined as follows:

20
21 A) Z' is X, where X is $>\text{COR}_1$, $>\text{CC-R}_1$,

26 or

B) Z' is $=C-X'-$ or $-X'-C=$, where R_n

$$R_n \quad R_n$$

is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
or X' is X , as defined above; or
 X' is $>C=O$;

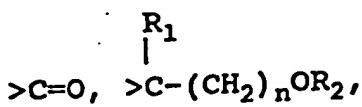
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III. Z" is defined as follows:

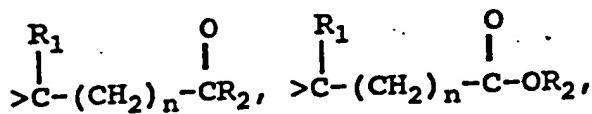
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A) Z'' is Y , where Y is $-O-$, $-N-$, $>CHR_1$,

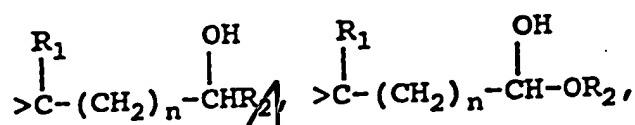
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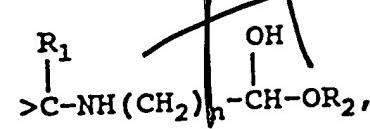
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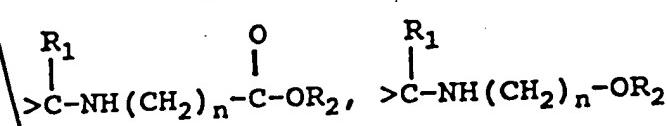
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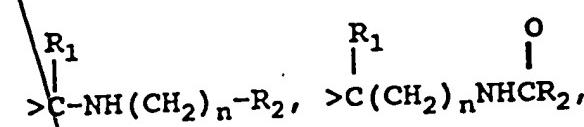
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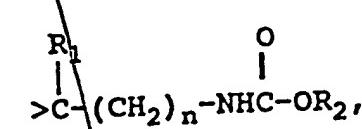
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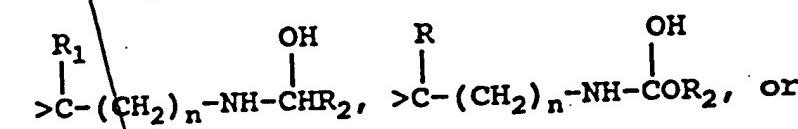
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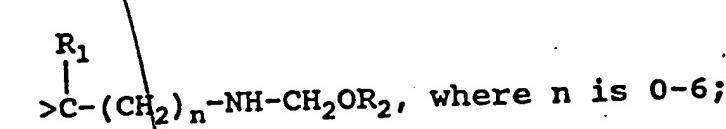
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68 or

B) Z'' is $-Y-CH-$ or $-CH-Y-$ where R_p

is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

72

73 provided that when:

74 3) each R_b , R_c , R_d , R_e , R_f , R_g , R_k , R_l , R_m , is $-H$;
75 R_f is $-CH_3$;

76

77 R_g is $-OH$, $-OCCH_3$;

78 R_i is $-H$, $-OH$, or $=O$;

79 R_o is $-H$ or $-Br$;

80 Z' is $>COH$; and

81 Z'' is $>CH_2$ or $-OH$; then

82 R_a is not $-F$, $-Br$, $-OH$ or $-H$;

83

84 and

85 4) each R_b , R_c , R_d , R_e , R_i , R_j , R_k , R_l ,
86 R_m , is $-H$;

87 R_f is $-CH_3$;

88 R_g is $-OH$; and

89 Z'' is $>CH_2$; then

90

91 Z' is not $>COCH_3$ or $>COCCH_3$; and

92 each R_a , R_o independently or together are
93 not $-OCH_3$ or $-H$;

94

95 and

96 5) each R_c , R_e , R_j , R_k , R_l , R_m , R_o is $-H$;

97 R_a is $-H$ or $-OCH_3$;

98 R_b is $-H$ or $-CH_3$;

99 R_d is $-OH$;

100 R_f is $-CH_3$;

101 R_g is $=O$;

102 R_i is $-OH$, $=O$ or $-C\equiv CH$; and

103 Z'' is $>CH_2$; then

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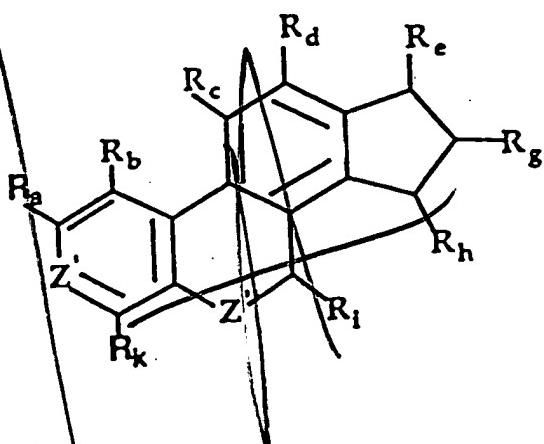
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Z' is not $>COH$; $>COCCH_3$, or $-H$;

107 where, in each formula set forth above, each R_1 and R_2
108 independently is -H, or substituted or unsubstituted alkyl,
109 alkenyl or alkynyl group of 1-6 carbons.

1 8. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:

3



4 wherein:

5 I. R_a-R_k are defined as follows:

6 A) each R_a , R_b , R_c , R_d , R_g , R_h , R_i , R_k
7 independently is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$,
8 $-F$, $-NHR_2$, $-Br$, or $-I$; and R_e is $-R_1$, $-OR_1$,
9 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;

10 or

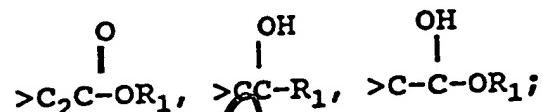
11 B) each R_a , R_b , R_c , R_d , R_k , is $-R_1$, $-OR_1$,
12 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and
13 each R_g , R_h , R_i , independently is $=O$,

14 -R₁, -OR₁, -OCOR₁, -SR₁, -F, -Br, or -I;
15 and R_e is =O, -R₁, -OR₁, -OCOR₁, -SR₁, -F,
16 -Br, -I or -C≡CH;

17 and

18 I. Z' is defined as follows:

19 A) Z' is X, where X is >COR₁, >C₂C-R₁,



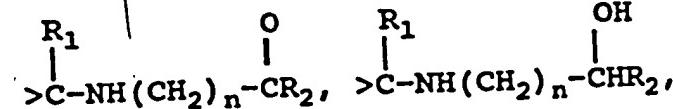
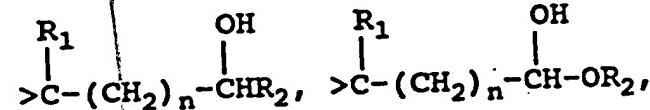
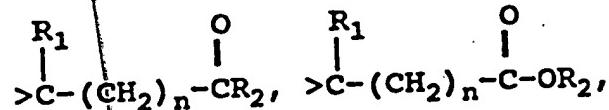
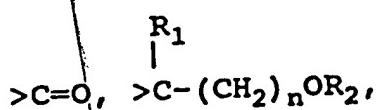
25 or

26 B) Z' is =C-X'- or -X'-C=, where R_n
27 is -R₁, -OR₁, -SR₁, -F, -NHR₂, -Br or -I,
28 and X' is X, as defined above;
29 or X' is also >C=O;

32 and

33 II. Z" is defined as follows:

34 A) Z" is Y, where Y is -O-, -N-, >CHR₁,



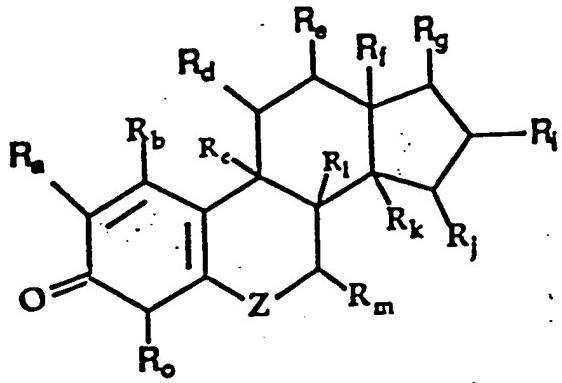
$$55 \quad \begin{array}{c} R_1 \\ | \\ >C-NH(CH_2)_n-R_2, \end{array}$$

64 
 65 $>C-(CH_2)_n-NH-CH_2OR_2$, where n is 0-6;
 66

67 · or

B) Z'' is $-Y-CH-$ or $-CH-Y-$, where R_p is

1 9. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:



3 wherein:

4 I. R_a - R_o are defined as follows:

5 A) each R_a , R_b , R_c , R_d , R_e , R_f , R_i , R_j , R_k , R_l ,
6 R_m , R_o independently is $-R_1$, $-OR_1$, $-OCOR_1$,
7 $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_g is $-R_1$,
8 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or
9 $-C\equiv CH$;

10 or

11 B) each R_a , R_b , R_c , R_f , R_k , R_l , independently
12 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
13 or $-I$; and each R_d , R_e , R_i , R_j , R_m , R_o
14 independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
15 $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$; and R_g is $=O$,
16 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$
17 or $-C\equiv CH$;

18 and

19 II. Z is defined as follows:

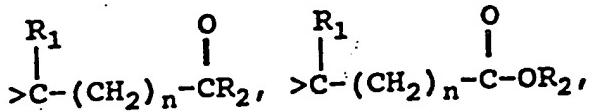
20 A) Z is Y, where Y is $-O-$, $-N-$, $>CHR_1$,
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22
23 $>C=O$, $>C-(CH_2)_nOR_2$,
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25

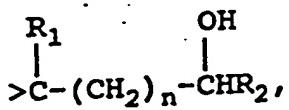
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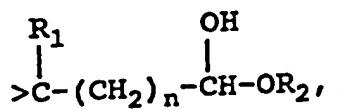
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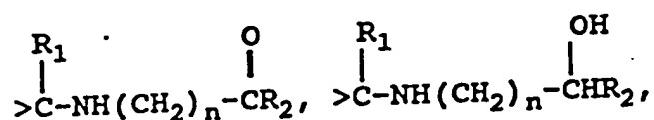
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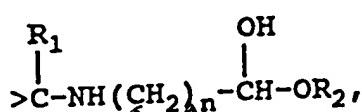
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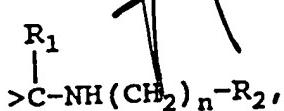
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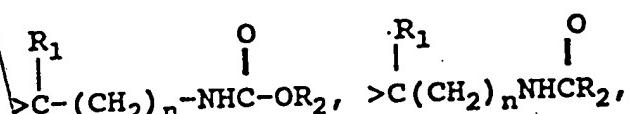
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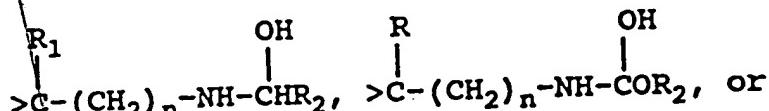
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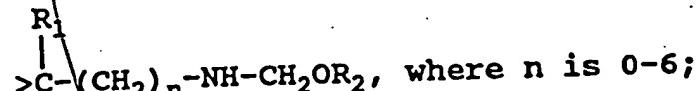
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57 or

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-*i*, -*s*, -*z*, -*Y*-CH- or -CH-Y-, where R₁

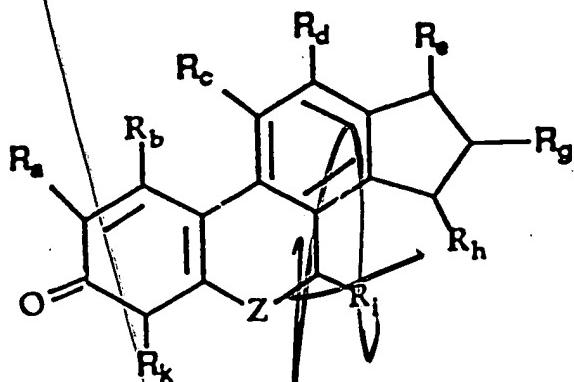
$$Z \text{ is } -\text{I}-\text{CH}_2-\text{OR} \quad \text{or} \quad \text{R}$$

is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;

62 where, in each formula set forth above, each R₁ and R₂
63 independently is -H, or substituted or unsubstituted alkyl,
64 alkenyl or alkynyl group of 1-6 carbons.

1 10. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:

3



4 wherein:

5 I. R_a-R_k are defined as follows:

6 A) each R_a, R_b, R_c, R_d, R_g, R_h, R_i, R_k
7 independently is -R₁, -OR₁, -OCOR₁, -SR₁,
8 -F, -NHR₁, -Br, or -I; and R_e is -R₁, -OR₁,
9 -OCOR₁, -SR₁, -F, -NHR₁, -Br, -I or -C≡CH;

10 or

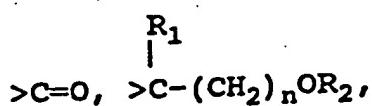
11 B) each R_a, R_b, R_c, R_d, independently is -R₁,
12 -OR₁, -OCOR₁, -SR₁, -F, -NHR₁, -Br, or -I;
13 and each R_g, R_h, R_i, R_k independently is
14 =O, -R₁, -OR₁, -OCOR₁, -SR₁, -F, -NHR₁, -Br
15 or -I; and R_e is -R₁, -OR₁, -OCOR₁, -SR₁,
16 -F, -NHR₁, -Br, -I or -C≡CH;

17 II. Z is defined as follows:

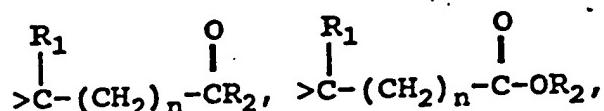
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1) z is y, where y is $-O-$, $-N-$, $>CHR_1$,

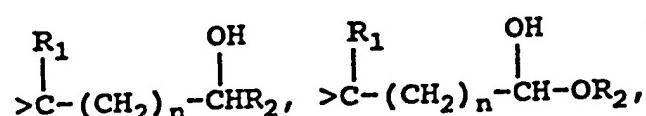
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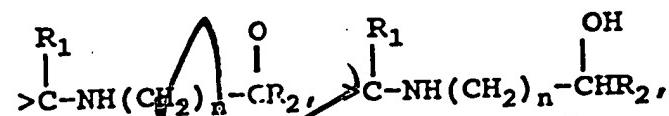
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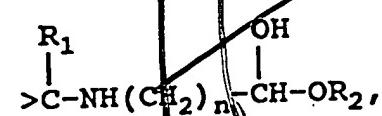
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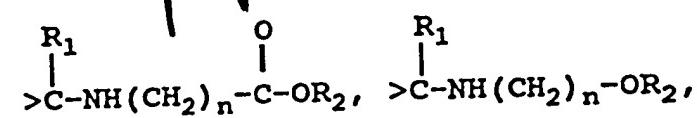
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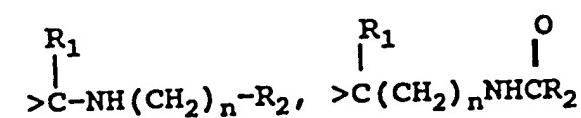
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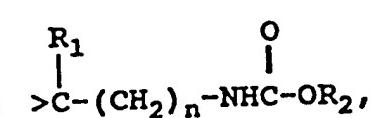
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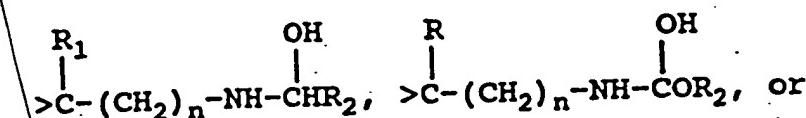
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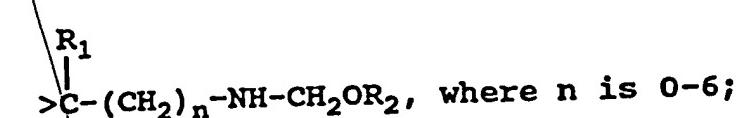
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Z is $-Y-CH-$ or $-CH-Y-$, where R_n
 R_n

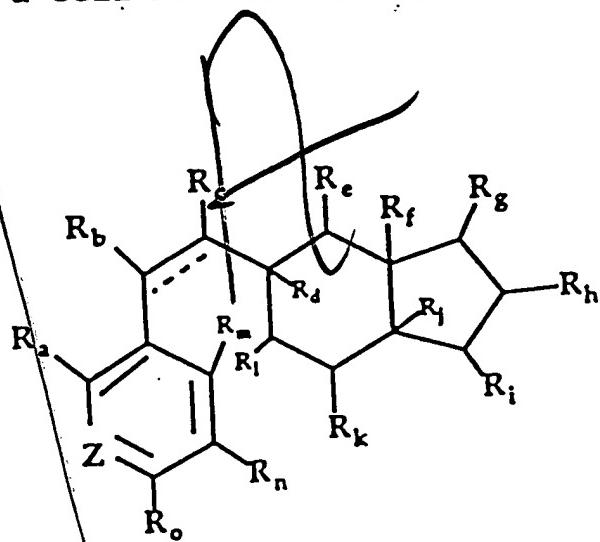
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is $-R_1$, $-OR_1$, $-SR_1$, $-F$,
 $-NHR_2$, $-Br$ or $-I$;

57 where, in each formula set forth above, each R_1 and R_2
58 independently is $-H$, or substituted or unsubstituted alkyl,
59 alkenyl or alkynyl group of 1-6 carbons.

1 11. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:

3



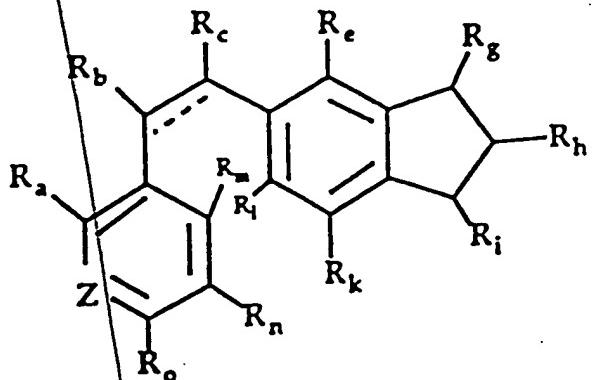
4 wherein:

5 I. R_a-R_o are defined as follows:

6 A) each R_a , R_b , R_c , R_d , R_e , R_f , R_g , R_h , R_j , R_k ,
7 R_l , R_m , R_n , R_o independently is $-R_1$, $-OR_1$,
8 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, or $-I$; and R_i
9 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
10 $-I$ or $-C\equiv CH$;

35 z is $=C-X'-$ or $-X'-C=$, where R_p
36 | |
37 R_p R_p
38 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$;
39 and X' is X , as defined above;
40 or X' is $>C=O$;
41 where, in each formula set forth above, each R_1 and R_2
42 independently is $-H$, or substituted or unsubstituted alkyl,
43 alkenyl or alkynyl group of 1-6 carbons; and the bond
44 indicated by $C\dots C$ is absent or, in combination with the $C-C$
45 bond is the unit $HC=CH$.

1 12. A compound of the general formula below, said
2 compound being a cell-mitosis-inhibiting compound:



4 wherein:

5 I. R_a - R_o are defined as follows:

- 6 A) each R_a , R_b , R_c , R_e , R_g , R_h , R_k , R_l , R_m , R_n ,
7 R_o independently is $-R_1$, $-OR_1$, $OCOR_1$, $-SR_1$,
8 $-F$, $-NHR_2$, $-Br$, or $-I$; and R_i is $-R_1$, $-OR_1$,
9 $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$, $-I$ or $-C\equiv CH$;
- 10 or
- 11 B) each R_a , R_e , R_l , R_m , R_n , R_o independently
12 is $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$,
13 $-I$; and each R_b , R_c , R_g , R_h is $=O$, $-R_1$,
14 $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$;
15 and R_i is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$,
16 $-NHR_1$, $-Br$, $-I$ or $-C\equiv CH$;
- 17 or
- 18 C) each R_a , R_b , R_c , R_e , R_k , R_m , R_n , R_o
19 independently is $-R_1$, $-OR_1$, $OCOR_1$, $-SR_1$,
20 $-F$, $-NHR_2$, $-Br$, $-I$; and each R_g , R_h
21 independently is $=O$, $-R_1$, $-OR_1$, $-OCOR_1$,
22 $-SR_1$, $-F$, $-NHR_1$, $-Br$ or $-I$; and R_i is $=O$,
23 $-R_1$, $-OR_1$, $-OCOR_1$, $-SR_1$, $-F$, $-NHR_1$, $-Br$, $-I$
24 or $-C\equiv CH$;

25 and

26 II. Z is defined as follows:

- 27 A) Z is X, where X is $>COR_1$, $>CC-R_1$, $>CC-OR_1$,
- 28
- 29
- 30 $>CC-R_1$, $>CC-OR_1$;
- 31
- 32
- 33 or
- 34 B) Z is $=C-X'-$ or $-X'-C=$, where R_p
- 35
- 36
- $$\begin{array}{c} O & O \\ | & | \\ OH & OH \\ | & | \\ >CC-R_1 & >CC-OR_1 \end{array}$$
- $$\begin{array}{c} | & | \\ R_p & R_p \end{array}$$

37 is $-R_1$, $-OR_1$, $-SR_1$, $-F$, $-NHR_2$, $-Br$ or $-I$,
38 and X' is X , as defined above;
39 or X' is $=O$;

39
40 where, in each formula set forth above, each R₁ and R₂
41 independently is -H, or substituted or unsubstituted alkyl,
42 alkenyl or alkynyl group of 1-6 carbons; and the bond
43 indicated by C \cdots C is absent or, in combination with the C-C
44 bond is the unit HC=CH.

1 13. The method of claim 1, wherein said
2 cell-mitosis-inhibiting composition is 2-methoxyestradiol.

1 14. The method of claim 1, wherein said
2 cell-mitosis-inhibiting composition is 2-fluoroestradiol.

1 15. The method of claim 1, wherein said
2 cell-mitosis-inhibiting composition is 2-bromoestradiol.

1 16. The method of claim 1, wherein said
2 cell-mitosis-inhibiting composition is 2-methoxyestrone.

1 17. The method of claim 1, wherein said cell-
2 mitosis-inhibiting composition is 17-ethynylestradiol.

1 18. The method of claims 1 or 2 wherein said
2 compound is further characterized in that

a) Z' is $=C-X'-$ or $-X'-C=$; and

R_1 R_2

5 Z' is $-\text{Y}-\text{CH}=$ or $-\text{CH}=\text{Y}-$: or

6 Z" IS -I-CH CH OR -CH -
7 | P R

B) Z' is X ; and Z'' is $-Y-CH-$ or $-CH-Y-$; or

R_p R_p

12
13
14

C) Z' is $=C-X'-$ or $-X'-C=$; and Z'' is Y .
 R_n R_n

1 19. The method of claims 3 or 4 wherein said
2 compound is further characterized in that Z is
3 $-Y-CH-$ or $-CH-Y-$.

4 | |
5 R_n R_n

1 20. The method of claims 5 or 6 wherein said
2 compound is further characterized in that Z is
3 $=C-X'-$ or $-X'-C=$.

4 | |
5 R_p R_p

1 21. The compound of claims 7 or 8, wherein said
2 compound is further characterized in that

A) Z' is $=C-X'-$ or $-X'-C=$; and
 R_n R_n

Z'' is $-Y-CH-$ or $-CH-Y-$; or
 R_p R_p

B) Z' is X ; and Z'' is $-Y-CH-$ or $-CH-Y-$; or
 R_p R_p

C) Z' is $=C-X'-$ or $-X'-C=$; and Z'' is Y .
 R_n R_n

1 22. The compound of claims 9 or 10, wherein said
2 compound is further characterized in that Z is
3 $-Y-CH-$ or $-CH-Y-$.

4 | |
5 R_n R_n

1 23. The compound of claims 11 or 12, wherein said
2 compound is further characterized in that Z is
3 $=C-X'-\text{ or }-\text{X}'-C=$.
4 | |
5 R_p R_p

1 24. The method of any one of claims 1-6, wherein at
2 least one of R_a→R_p is -OCH₃.

1 25. The compound of any one of claims 7-12, wherein
2 at least one of R_a→R_p is -OCH₃.

*Add
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